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ABSTRACT

Self-monitoring refers to deliberate attention to aspects of one's behavior, and is an important component of self-regulated learning, which depends on favorable self-evaluations of one's capabilities and progress toward learning goals. This paper argues that self-regulated learning is enhanced when students self-monitor their learning progress, and that positive self-evaluations sustain learning by sustaining motivation. The paper begins by summarizing social cognitive theoretical ideas on self-regulation, self-efficacy, and achievement goals and then describes a social cognitive model of self-regulated learning. The paper next describes several research projects that explored the role of self-monitoring during cognitive skill acquisition. The studies involved elementary school students learning mathematical skills; in the first study, students self-monitored their completed work, and in the next two studies the focus of self-monitoring was on learning progress and performance capabilities. All three studies supported theory and research on the benefits of self-monitoring in learning. The paper concludes with a discussion of the implications of self-regulation for teaching and learning. Contains 26 references. (EV)

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Self-Monitoring as a Motivator During Instruction With Elementary School Students

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Abstract

Self-monitoring refers to deliberate attention to aspects of one's behavior. Self-monitoring is an important component of self-regulated learning when students self-monitor their learning progress. Effective self-regulated learning depends on favorable self-evaluations of one's capabilities and progress toward learning goals because these beliefs help sustain motivation for learning and lead to higher achievement. Social cognitive theoretical ideas on self-regulation, self-efficacy, and achievement goals, are summarized and a social cognitive model of self-regulated learning is descibed. Research is presented on the influence of self-monitoring during learning. I conclude by discussing implications of theory and research for classroom teaching and learning.

Self-Monitoring as a Motivator During Instruction With Elementary School Students

Self-monitoring (or self-observation) refers to deliberate attention to aspects of one's behavior. Self-monitoring is an important component of self-regulated learning, or self-generated thoughts, feelings, and actions, that are systematically designed to affect one's learning and motivation (Schunk, 1994; Zimmerman, 1989, 1990, 1994; Zimmerman & Kitsantas, 1996). Self-regulatory processes include attending to and concentrating on instruction; organizing, coding, and rehearsing information to be remembered; establishing a productive work environment; using resources effectively; holding positive beliefs about one's capabilities, the value of learning, the factors influencing learning, and the anticipated outcomes of actions; and experiencing pride and satisfaction with one's efforts (Schunk, 1994).

Self-regulated learning is assuming increasing importance among educators. Research shows that students are mentally active during learning rather than being passive recipients of information, and that they exert a large degree of control over attainment of their goals (Pintrich & Schrauben, 1992). Educators are realizing the importance of students developing self-regulatory competence in addition to subject-area knowledge and skills.

The central thesis of this paper is that self-regulated learning is enhanced when students self-monitor their

learning progress. Research supports the hypothesis that effective self-regulated learning depends on favorable self-evaluations of one's capabilities and progress in learning because these beliefs help sustain motivation for learning.

In this paper I address several issues related to the role of self-monitoring during self-regulated learning. I initially summarize theoretical ideas involving self-regulation, self-efficacy, and achievement goals. I then present research on the influence of self-monitoring during learning. I conclude by discussing implications of theory and research for classroom teaching and learning.

Theoretical Background

Social Cognitive Theory of Self-Regulation

The conceptual framework is based on Bandura's (1986, 1991) social cognitive theory. This theory views self-regulation as comprising self-monitoring (or self-observation), self-judgment, and self-reaction (Bandura, 1986; Kanfer & Gaelick, 1986). Self-monitoring is necessary but by itself insufficient for sustained self-regulation. Self-judgment refers to comparing present performance with one's goal. Such comparisons inform one of goal progress and exert motivational effects on future performance. Self-reactions to goal progress may be evaluative or tangible. Evaluative reactions involve beliefs about progress. The belief that one is making progress, along with the anticipated satisfaction of goal attainment, enhances self-efficacy and sustains motivation. People also react in

tangible fashion to perceived progress (e.g., buying something they want).

Self-monitoring of one's behaviors can inform and motivate. The information gained is used to determine one's goal progress. Self-monitoring is most helpful when it addresses the specific conditions under which the behaviors occur. These conditions then can be altered to improve performance (e.g., ineffective studying conditions can be replaced by better environmental features).

Self-monitoring also can motivate behavioral change; keeping a record of what one does may prove surprising. Students with poor study habits might be amazed to learn how much time they waste on nonacademic activities. Self-monitoring can motivate one to change, but desire alone usually is insufficient. Sustained motivation depends on people's self-efficacy and outcome expectations (discussed later). For students to change ineffective study habits they must believe that they are capable of altering their habits and that if they do better outcomes will result.

Students cannot regulate their actions if they are not fully aware of them. Behavior can be assessed on such dimensions as quality (how well), quantity (how much), rate (how quickly), and originality (how unique) (Schunk, 1989). Self-monitoring is aided with the use of self-recording, where instances of behavior are recorded along with such features as the time, place, and duration of occurrence

(Karoly, 1982). Without recording, self-monitoring may not faithfully reflect actual behavior due to selective memory.

Two important criteria of self-recording are regularity and proximity. Regularity means that behavior is observed on a continuous basis (e.g., hourly) rather than intermittently. Nonregular observation yields less reliable results. Proximity means that behavior is observed close in time to its occurrence rather than long afterwards. Proximal observations provide continuous information to use in gauging goal progress (Mace, Belfiore, & Shea, 1989).

At the start of a learning activity students have such goals as acquiring skills and knowledge, finishing work, and making good grades. As they work, students monitor, judge, and react to perceptions of their goal progress. These self-regulatory processes interact with one another. As students monitor their progress they judge it against their goal and react positively or negatively. Judgments and reactions set the stage for further observations. These processes also interact with the environment (Zimmerman, 1989). Students who judge their learning progress as inadequate may react by asking for teacher assistance. Teachers then may teach students a better strategy, which students use to foster learning.

Self-Efficacy

Effective self-regulation depends on students developing a sense of self-efficacy for learning and performing well. Self-efficacy refers to personal beliefs

about one's capabilities to learn or perform behaviors and skillful actions at designated levels (Bandura, 1986, 1991). Self-efficacy can affect choice of activities, effort, persistence, and achievement. Compared with students who doubt their learning capabilities, those with high efficacy participate more readily, work harder, persist longer in the face of difficulties, and achieve at a higher level.

Learners acquire information to appraise their efficacy from their performances, vicarious (observational) experiences, forms of persuasion, and physiological reactions (Schunk, 1990). Information acquired from these sources does not influence efficacy automatically but rather is cognitive appraised (Bandura, 1986). Learners weigh and combine perceptions of their ability, task difficulty, amount of effort expended, amount and type of assistance received from others, similarity to models, and persuader credibility (Schunk, 1990).

Effective self-regulation depends on holding an optimal sense of self-efficacy for learning (Bandura, 1986; Bouffard-Bouchard, Parent, & Larivee, 1991; Zimmerman, 1989). Students who feel efficacious about learning choose tasks, select effective strategies, expend effort, and persist (Bandura, 1991; Schunk, 1991; Zimmerman, 1989). As students work on a task they compare their performances to their goals. Self-evaluations of progress enhance self-efficacy and keep students motivated to improve.

Self-efficacy is not the only influence on achievement behavior. Outcome expectations, or perceived consequences of actions, are critical because students engage in tasks they believe will be followed by desired outcomes. Skills are important; no amount of efficacy will produce a competent performance if requisite skill is lacking. Values, or perceived importance of learning, plays a role because students engage in activities they find personally satisfying.

Achievement Goals

Goals are important for self-regulation because they provide standards that students can use to evaluate their present performances (Bandura, 1986; Locke & Latham, 1990). When students adopt a goal, they may experience a sense of self-efficacy for attaining it, which motivates them to engage in appropriate self-regulatory activities. Self-efficacy is substantiated as they observe their goal progress because self-evaluations of progress convey they are acquiring skill. Self-efficacy sustains motivation and leads learners to establish new goals when they master their present ones.

The effects of goals depend on the properties of specificity, proximity, and difficulty (Bandura, 1988; Locke & Latham, 1990). Goals that incorporate specific performance standards, are close at hand, and are moderately difficult, are more likely to enhance performance than goals

that are general, extend into the future, or are perceived as overly easy or difficult (Schunk, 1990).

Goal effects also may depend on whether the goal denotes a learning or performance outcome (Meece, 1991). A learning goal refers to what knowledge and skills students are to acquire; a performance goal denotes what task students are to complete (Dweck & Leggett, 1988). Goal research typically has focused on such goals as rate or quantity of performance, but educators increasingly are advocating greater emphasis on learning processes and strategies (Weinstein, Goetz, & Alexander, 1988).

Learning and performance goals may exert different effects on self-regulatory activities and achievement beliefs even when their goal properties are similar. Learning goals focus students' attention on processes and strategies that help them acquire competencies (Ames, 1992). Students who pursue a learning goal are apt to experience a sense of efficacy for attaining it and be motivated to engage in task-appropriate activities (Schunk, 1996). Self-efficacy is substantiated as they work on the task and note progress. Perceived progress in skill acquisition and a sense of efficacy for continued learning sustain self-regulatory activities and enhance skillful performance.

In contrast, performance goals focus students' attention on completing tasks. Such goals may not highlight the importance of the processes and strategies underlying task completion or raise efficacy for learning (Schunk,

1996). As students work on tasks, they may not compare present and prior performances to determine progress. Performance goals can lead to social comparisons of one's work with that of others to determine progress (Ames, 1992). Such comparisons can result in low self-evaluations of ability among students who experience difficulties, which can regard motivation (Meece, 1991).

Research Evidence

I will describe some research projects that explored the role of self-monitoring of learning progress during cognitive skill acquisition. In these studies, elementary school students were learning mathematical skills. They received instruction and practice opportunities. Conditions involved different forms of self-monitoring. In the first study, students self-monitored their work completed; in the next two studies the focus of self-monitoring was on learning progress and performance capabilities. Self-regulatory processes are involved because students engaged in much independent learning.

Self-Monitoring of Work Completed

Schunk (1983) initially pretested third-grade children lacking subtraction skills on subtraction self-efficacy, persistence solving problems, and achievement. The self-efficacy measure asked children to judge their capabilities for solving different types of subtraction problems. Following the pretest, children received modeled instruction and practice over sessions. During each instructional

period, some children (self-monitoring) recorded the number of problems they solved during the session. Children assigned to a second condition (external monitoring) had this information recorded by an adult. Those in a third condition (no monitoring) received instruction and practice but did not monitor progress or have it recorded. Following the last instructional session, students received a posttest on self-efficacy, persistence, and achievement.

Results showed that the self- and external-monitoring conditions led to higher posttest self-efficacy, persistence, and achievement, than did the no-monitoring condition. The two monitoring conditions did not differ significantly on these measures. Interestingly, the three conditions did not differ in the actual number of problems completed or solved correctly during the instructional sessions. These results support the theoretical notion that self-efficacy is not a mere reflection of past performance and suggests that it was the perception of skill improvement rather than actual improvement that led to greater persistence and achievement. Although self- and external-monitoring were equally effective, self-monitoring is preferable over longer time periods because it requires less teacher assistance and provides students with a sense of control over their learning outcomes (Schunk, 1983).

Self-monitoring also can help promote long-term maintenance of self-regulatory strategy use. Much strategy instruction research shows that students may learn and

practice strategies that benefit their performances but discontinue strategy use when no longer required (Pressley et al., 1990). They may believe that the strategy is not useful in improving their performances (Schunk, 1989). Students who continue to monitor and record use of strategies should be less apt to discontinue use.

Zimmerman, Bonner, and Kovach (1996) describe a self-monitoring procedure useful for many academic subjects. This procedure uses a form that students complete. For example, to self-monitor study time students might record such information as the date, assignment, time started, time spent, and information about the study context (where, with whom, distractions). To monitor self-efficacy, students might record how well they expect to score on a quiz and their confidence for attaining that score.

Self-Monitoring of Progress and Capabilities

Schunk (1996) conducted two studies that investigated the role of learning goals and self-monitoring of progress and capabilities during mathematical skill acquisition. Participants in Study 1 were fourth-graders lacking fraction skills. Students were pretested on goal orientations, self-efficacy, persistence, and achievement. Goal orientations are sets of behavioral intentions that can influence how students approach and engage in learning activities. Four orientations were assessed: task--desire to independently master and understand academic work; ego--desire to perform well to please the teacher and avoid trouble; affiliative--

desire to share ideas and work with peers; work avoidant--desire to accomplish academic work with minimum effort. The self-efficacy, persistence, and achievement measures, included addition and subtraction of fractions. For the efficacy test, children were shown sample problems and judged their certainty of correctly solving problems of each type.

Following the pretest, children were assigned to one of four conditions: learning goal with self-evaluation, learning goal without self-evaluation, performance goal with self-evaluation, performance goal without self-evaluation. Students received instructional sessions over several days, which included modeled instruction and practice solving fraction problems.

Goal instructions were given at the start of the instructional sessions. To learning-goal students the researcher stressed the goal of learning to solve problems; to performance-goal students the researcher emphasized the goal of solving problems. Children assigned to self-evaluation conditions self-monitored and judged their fraction capabilities at the end of each instructional session for solving types of fraction problems covered during that session. A posttest similar to the pretest was given following the last instructional session.

It was predicted that learning goals would facilitate achievement outcomes more than performance goals, that self-monitoring and self-evaluation of performance capabilities

would prove more effective than no monitoring, and that the combination of learning goals with self-monitoring and self-evaluation would be the most advantageous.

Results generally supported the hypotheses. The performance goal/no self-evaluation condition scored significantly lower than the other three conditions on self-efficacy, achievement, lesson performance, and task orientation, and higher on ego orientation.

Study 2 replicated Study 1 with some modifications. The self-monitoring of capabilities treatment in Study 1 was powerful because children assessed fraction capabilities daily. This type of repetitive evaluation likely made it clear to children that their skills were improving and outweighed differential effects due to type of goal. Although Study 1 showed that learning goals are effective in the absence of explicit self-evaluation, possibly learning goals also would prove advantageous when self-evaluation is less frequent, a situation more typical in school because learners typically do not evaluate their capabilities.

In Study 2, students received a learning or performance goal but all engaged in self-monitoring; however, the latter occurred once rather than daily. Also, children monitored and assessed their perceived progress in learning rather than their capabilities.

Significant goal effects were obtained on posttest self-efficacy and achievement, lesson performance, and the task, ego, and work-avoidant orientations. All effects were

in favor of the learning goal except for ego and work-avoidant orientations.

These studies support theory and research on the benefits of learning goals and self-monitoring of progress and capabilities on self-regulation, self-efficacy, and achievement (Bandura, 1988; Elliott & Dweck, 1988; Schunk, 1990; Zimmerman, 1989, 1994). Study 1 did not support the hypothesis that combining a learning goal with self-monitoring and evaluation of capabilities raises achievement outcomes more than does combining a performance goal with self-evaluation. Daily monitoring and evaluation are intensive and should communicate to children that they are becoming skillful. When self-evaluation is salient, the type of goal may make little difference. In contrast, the single assessment in Study 2 may not have made it clear that students had become more competent. Given that this evaluation was closely tied to the learning goal, it complemented it well and may have led to the higher motivation and achievement.

Implications for Teaching and Learning

Self-regulation theory and research results have implications for teaching and learning. One implication is that <u>self-monitoring is a critical element of self-reflective practice</u>, or the means whereby students further the development of self-regulatory competence through such processes as self-regulation of strategy use and achievement beliefs. Self-reflective practice allows learners to

monitor, evaluate, and adjust their performances during learning. Learners may adjust their strategies based on assessment of their learning progress and determine what activities will best assist them to accomplish learning goals.

As I noted earlier, self-monitoring can promote long-term maintenance of self-regulatory strategy use. Students who monitor and record their use of strategies should be less apt to discontinue their use. Self-monitoring of perceived learning progress and development of skills can help maintain students' motivation for learning, especially if material becomes difficult and students begin to doubt whether they can learn.

A second implication is that teachers must provide students with training in self-monitoring and opportunities for its use. For example, teachers can teach students a simple self-recording method and have them practice it on increasingly more-complex tasks. Students also can be given training in methods of self-evaluation of progress and capabilities, along with opportunities to evaluate their learning. If students are unable to determine progress on their own, teachers can point it out, such as by showing them how their spelling or arithmetic performance on quizzes has improved over time.

A third implication is to design learning environments to provide information about progress. This is especially helpful when progress otherwise is difficult to ascertain.

The use of portfolios can be beneficial; students can keep samples of their work, monitor present performance, and compare that to their prior work. Computers also can track progress. As students work on computer programs, information can be stored showing how well students are answering questions, and these data can periodically be accessed to show improvement.

A final recommendation is to use learning goals and provide feedback on goal progress. This can be done formally; for example, teacher and student can hold a goal-setting conference at the start of a unit where goals are established and then at different times during the unit to assess progress. It also can be accomplished informally, such as when teachers provide students information on the learning goal for the lesson. Once goals are attained, students can set new learning goals. Combined with progress feedback, learning goals offer standards to self-monitor and a means for promoting motivation, self-regulation, and skill acquisition.

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